

# INTERNATIONAL SEARCH REPORT

International application No.  
**PCT/AU03/00923**

<b>A. CLASSIFICATION OF SUBJECT MATTER</b>				
Int. Cl. <sup>7</sup> : G06F 17/18				
According to International Patent Classification (IPC) or to both national classification and IPC				
<b>B. FIELDS SEARCHED</b>				
Minimum documentation searched (classification system followed by classification symbols)				
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched				
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) WPAT: IPC and keywords. Keywords included classif+, discriminant and statistic.				
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>				
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.		
X	US 5970239 A (Bahl et al) 19 October 1999 - whole document	1 to 16		
X	WO 98/32088 A (Chiron Corporation) 23 July 1998 - whole document	1 to 16		
X	WO 02/25405 A2 (The Regents of the University of California) 28 March 2002 - whole document	1 to 16		
<input checked="" type="checkbox"/> Further documents are listed in the continuation of Box C <input checked="" type="checkbox"/> See patent family annex				
<p>* Special categories of cited documents:</p> <table style="width: 100%;"> <tr> <td style="width: 40%;"> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </td> <td style="width: 60%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p> </td> </tr> </table>			<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>
<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>			
Date of the actual completion of the international search 8 August 2003		Date of mailing of the international search report <div style="text-align: right;">14 AUG 2003</div>		
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustalia.gov.au Facsimile No. (02) 6285 3929		Authorized officer  <b>J.W. THOMSON</b> Telephone No : (02) 6283 2214		

**INTERNATIONAL SEARCH REPORT**

International application No.

**PCT/AU03/00923**

<b>C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
<b>Category*</b>	<b>Citation of document, with indication, where appropriate, of the relevant passages</b>	<b>Relevant to claim No.</b>
<b>X</b>	Dr Min Qiu, 'Multivariate Discriminant Analysis' Advanced Data Analysis, Information Management and Marketing, University of Western Australia 4 August 2002 [retrieved on 11 August 2003] Retrieved from the Internet: URL: <a href="http://www.imm.ecel.uwa.edu.au/unit450461/lectures/450461_week5.pdf">http://www.imm.ecel.uwa.edu.au/unit450461/lectures/450461_week5.pdf</a>	<b>1 to 16</b>
<b>A</b>	EP 501784 B1 (Philip Morris Products Inc) 2 September 1992 (note column 5 line 44 to column 12 line 33)	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/AU03/00923

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report			Patent Family Member				
US	5970239	NONE					
WO	200225405	AU	200194644	US	2002111742		
EP	501784	US	5146510	CA	2061865	HK	1013872
		JP	5126757	US	5353356	EP	382466
		JP	2242482	US	5046111	US	5165101
		US	5189708				
WO	9832088	AU	60237/98	EP	953177	US	5860917
END OF ANNEX							

# PATENT COOPERATION TREATY PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

REC'D 19 APR 2005

WIPO

PCT

Applicant's or agent's file reference <b>FP18141</b>	<b>FOR FURTHER ACTION</b>	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. <b>PCT/AU2003/000923</b>	International Filing Date (day/month/year) <b>18 July 2003</b>	Priority Date (day/month/year) <b>18 July 2003</b>
International Patent Classification (IPC) or national classification and IPC <b>Int. Cl. <sup>7</sup> G06F 17/18</b>		
Applicant <b>COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION et al</b>		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 2 sheet(s).

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand <b>10 January 2005</b>	Date of completion of the report <b>6 April 2005</b>
Name and mailing address of the IPEA/AU <b>AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929</b>	Authorized Officer  <b>J.W. THOMSON</b> Telephone No. (02) 6283 2214

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/AU2003/000923

**I. Basis of the report****1. With regard to the elements of the international application:\***

- ☐ the international application as originally filed.
- ☒ the description, pages 1 to 9, as originally filed,  
pages , filed with the demand,  
pages , received on with the letter of
- ☒ the claims, pages , as originally filed,  
pages , as amended (together with any statement) under Article 19,  
pages , filed with the demand,  
pages 11 to 12, received on 30 March 2005 with the letter of 30 March 2005
- ☒ the drawings, pages 1 to 2, as originally filed,  
pages , filed with the demand,  
pages ; received on with the letter of
- ☐ the sequence listing part of the description:  
pages , as originally filed  
pages , filed with the demand  
pages , received on with the letter of

**2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.**

These elements were available or furnished to this Authority in the following language which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

**3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:**

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

**4. ☐ The amendments have resulted in the cancellation of:**

- ☐ the description, pages
- ☐ the claims, Nos.
- ☐ the drawings, sheets/fig.

**5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\***

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Claims 1 to 16	YES
	Claims	NO
Inventive step (IS)	Claims 1 to 16	YES
	Claims	NO
Industrial applicability (IA)	Claims 1 to 16	YES
	Claims	NO

**2. Citations and explanations (Rule 70.7)**Citations

D1 - US 5970239 A (Bahl et al) 19 October 1999

D2 - WO 1998/032088 A (Chiron Corporation) 23 July 1998

D3 - WO 2002/025405 A2 (The Regents of the University of California) 28 March 2002

D4 - Dr Min Qiu, 'Multivariate Discriminant Analysis' Advanced Data Analysis, Information Management and Marketing, University of Western Australia 4 August 2002 [retrieved on 11 August 2003] Retrieved from the Internet: URL:  
[http://www.imm.ecel.uwa.edu.au/unit450461/lectures/450461\\_week5.pdf](http://www.imm.ecel.uwa.edu.au/unit450461/lectures/450461_week5.pdf)

D5 - EP 501784 B1 (Philip Morris Products Inc) 2 September 1992 (note column 5 line 44 to column 12 line 33)

D5 has been assessed as an 'A' citation and is therefore of no further relevance to this opinion.

Novelty (N) and Inventive Step (IS) of Claims 1 to 16

Claims 1 to 16 are novel and contain an inventive step when compared to prior art documents D1 to D4, as none of these citations contain all of the essential features of the claimed invention nor suggest a similar solution to the problem.

For instance, none of the citations teach or suggest the essential feature that the discriminant rule must be based on multi-variate normal class densities each having substantially diagonal co-variance matrices.

Industrial Applicability (IA) of Claims 1 to 16

The claimed invention has industrial applicability in the design of statistical models for systems.

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7. Computer software which, when executed by a computer, enables the computer to carry out the method as claimed in any one of claims 1 to 6.

5 8. A computer storage medium comprising the software as claimed in claim 7.

9. A statistical model for predicting a class of an observation, wherein the model includes one or more  
10 variables that have been selected using the method defined in any one of claims 1 to 6.

10. An apparatus for selecting one or more variables for use with a statistical model, the system  
15 comprising:

data creating means arranged to create a plurality of unique subsets of variables of multivariate data;

20 a processing means arranged to determine the performance of a discriminant rule when used with each of the subsets, the discriminant rule being based on multivariate normal class densities each having substantially diagonal covariance matrices; and

25 a selecting means arranged to select the one or more variables from at least one of the subsets that results in a desired performance of the discriminant rule.

11. The apparatus as claimed in claim 10, wherein the data creating means is arranged to create the  
30 plurality of unique subsets by identifying a variable in the multivariate data that is not a member of a set of variables, and adding the identified variable to the set.

12. The apparatus as claimed in any one of  
35 claims 10 or 11, wherein the determining means is arranged to determine the performance of the discriminant rule by assessing a prediction error rate of the discriminant rule.

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13. The apparatus as claimed in claim 12, wherein the prediction error rate is a cross-validated error rate.

5 14. The apparatus as claimed in any one of the preceding claims, wherein the desired performance of the discriminant rule comprises the lowest possible prediction error rate of the discriminant rule.

10 15. The apparatus as claimed in any one of claims 10 to 14, wherein the multivariate data comprises gene expression data.

15 16. The apparatus as claimed in any one of claims 10 to 15, wherein the data creating means, processing means and selecting means are in the form of a computer running software.